PROCEEDINGS

OF THE

ROYAL SOCIETY OF LONDON

SERIES A

CONTAINING PAPERS OF A MATHEMATICAL AND PHYSICAL CHARACTER.

VOL. LXXXVIII.

LONDON:

PRINTED FOR THE ROYAL SOCIETY AND SOLD BY
HARRISON AND SONS, ST. MARTIN'S LANE,
PRINTERS IN ORDINARY TO HIS MAJESTY.

JULY, 1913.

LONDON:
HARRISON AND SONS, PRINTERS IN ORDINARY TO HIS MAJESTY,
ST. MARTIN'S LANE.

CONTENTS.

SERIES A. VOL. LXXXVIII.

No. A 600.—January 29, 1913.

PAGE

Address of the President, Sir Archibald Geikie, K.C.B., at the Anniversary Meeting on November 30, 1912 1

The Motion of a Viscous Liquid due to Uniform and Periodic Motion Maintained over a Segment of an Infinite Plane Boundary. By W. J. Harrison, M.A., Fellow of Clare College, Cambridge; Assistant Lecturer in Mathematics, University of Liverpool. Communicated by Sir J. Larmor, Sec. R.S. 13

A Comparison of the Spectra of Fluorescent Röntgen Radiations. By J. Crosby Chapman, B.Sc., Layton Research Scholar of the University of London, King's College: Research Student of Gonville and Caius College, Cambridge. Communicated by Prof. Sir J. J. Thomson, O.M., F.R.S. 24

The Synthesis of a Silicalcyanide and of a Felspar. By J. Emerson Reynolds, M.D., Sc.D., F.R.S. (Plate 1) 37

A Determination of the Radiation Constant. By H. B. Keene, B.Sc., Assistant Lecturer in Physics in the University of Birmingham. Communicated by Prof. J. H. Poynting, F.R.S. 49

Optical Investigation of Solidified Gases. II.—The Crystallographic Properties of Hydrogen and Oxygen. By Walter Wahl, Ph.D. Communicated by Sir James Dewar, F.R.S. 61

The Photo-electric Behaviour of Iron in the Active and Passive State. By H. Stanley Allen, M.A., D.Sc., Senior Lecturer in Physics at University of London, King's College. Communicated by Prof. C. G. Barkla, F.R.S. 70

The Penetrating Power of the γ-Rays from Radium C. By Alexander S. Russell, M.A., Carnegie Research Fellow of the University of Glasgow. Communicated by Prof. E. Rutherford, F.R.S. 75

No. A 601.—February 24, 1913.

On the Scattering and Absorption of Light in Gaseous Media, with Applications the Intensity of Sky Radiation. By Louis Vessot King, B.A. (Cantab.), Lecturer in Physics, McGill University, Montreal. Communicated by Sir J. Larmor, Sec. R.S. (Abstract) 83

Some Electrical and Chemical Effects of the Explosion of Azoimide. By Rev. P. J. Kirkby, M.A., D.Sc., and J. E. Marsh, M.A., F.R.S. 90

On a New Method of Measuring the Torque produced by a Beam of Light in Oblique Refraction through a Glass Plate. By Guy Barlow, D.Sc. Communicated by Prof. J. H. Poynting, F.R.S. 100

PAGE

The Effect of Junctions on the Propagation of Electric Waves along Conductors. By Lord Rayleigh, O.M., F.R.S. 103

Duration of Luminosity of Electrical Discharge in Gases and Vapours. By the Hon. R. J. Strutt, F.R.S., Professor of Physics, Imperial College of Science, South Kensington 110

The Positive Ionisation Produced by Platinum and by Certain Salts when Heated. By Frank Horton, M.A., D.Sc., Fellow of St. John's College, Cambridge. Communicated by Prof. Sir J. J. Thomson, O.M., F.R.S. 117

No. A 602.—March 31, 1913.

Ionic Size in Relation to Molecular Physics, together with a New Law Relating to the Heats of Formation of Solid, Liquid, and Ionic Molecules. By W. R. Bousfield, M.A., K.C. Communicated by Sir J. Larmor, Sec. R.S. 147

On the New Theory of Integration. By W. H. Young, Sc.D., F.R.S., Professor of Mathematics, University of Liverpool 170

On the Formation of Usually Convergent Fourier Series. By W. H. Young, Sc.D., F.R.S., Professor of Mathematics, University of Liverpool 178

On a Cassegrain Reflector with Corrected Field. By R. A. Sampson, F.R.S. (Abstract) 188

On a New Analytical Expression for the Representation of the Components of the Diurnal Variation of Terrestrial Magnetism. By George W. Walker, M.A., A.R.C.Sc. Communicated by Prof. J. H. Poynting, F.R.S. 191

A Spectro-photometric Comparison of the Emissivity of Solid and Liquid Copper and of Liquid Silver at High Temperatures with that of a Full Radiator. By C. M. Stubbs, M.A., M.Sc. Communicated by Prof. F. G. Donnan, F.R.S. 195

On the Spontaneous Crystallisation and the Melting- and Freezing-point Curves of two Substances which form Mixed Crystals and whose Freezing-point Curve exhibits a Transition Point.—Mixtures of *p*-Bromnitrobenzene and *p*-Chlornitrobenzene. By Miss Florence Isaac. Communicated by Sir Henry A. Miers, F.R.S. 205

The Excitation of γ-Rays by the α-Rays of Ionium and Radiothorium. By J. Chadwick, M.Sc., Beyer Fellow of the University of Manchester, and A. S. Russell, M.A., Carnegie Research Fellow of the University of Glasgow. Communicated by Prof. E. Rutherford, F.R.S. 217

Re-reduction of Dover Tidal Observations, 1883–84, etc. By Edward Roberts, I.S.O., F.R.A.S. Communicated by Lord Rayleigh, O.M., F.R.S. 230

Studies of the Processes Operative in Solutions. XXV.—The Influence of Non-Electrolytes on Solubility. The Nature of the Processes of Dissolution and Precipitation. By H. E. Armstrong, F.R.S., and J. Vargas Eyre, Ph.D. 234

Studies of the Processes Operative in Solutions. XXVI.—The Disturbance of the Equilibrium in Solutions of Fructose by Salts and by Non-electrolytes. By E. E. Walker, B.Sc. Communicated by Prof. H. E. Armstrong, F.R.S. 246

No. A 603.—May 8, 1913.

PAGE

An Investigation into the Magnetic Behaviour of Iron and some other Metals under the Oscillatory Discharge from a Condenser. By E. W. Marchant, D.Sc., M.I.E.E., David Jardine Professor of Electrical Engineering in the University of Liverpool. Communicated by Prof. S. P. Thompson, F.R.S. 254

Load-Extension Diagrams taken with the Optical Load-Extension Indicator. By W. E. Dalby, City and Guilds Engineering College. Communicated by Prof. H. E. Armstrong, F.R.S. (Plates 2 and 3) 281

On a Fluorescence Spectrum of Iodine Vapour. By Prof. J. C. McLennan. Communicated by Sir J. Larmor, F.R.S. (Plate 4) 289

The Abnormal Kinetic Energy of an Ion in a Gas. By F. B. Pidduck, M.A., Fellow of Queen's College, Oxford. Communicated by Prof. J. S. Townsend, F.R.S. 296

The Influence of Chemical Constitution upon Interfacial Tension. By W. B. Hardy, F.R.S. 303

The Tension of Composite Fluid Surfaces.—No. II. By W. B. Hardy, F.R.S. 313

No. A 604.—June 2, 1913.

A Simple Method of Finding the Approximate Period of Stable Systems. By A. Mallock, F.R.S. 333

The Motion of Electrons in Gases. By Prof. J. S. Townsend, F.R.S., and H. T. Tizard 336

Optical Investigation of Solidified Gases. III.—The Crystalline Properties of Chlorine and Bromine. By Walter Wahl, Ph.D. Communicated by Sir James Dewar, F.R.S. 348

The Relation between the Crystal-Symmetry of the Simpler Organic Compounds and their Molecular Constitution.—Part I. By Walter Wahl, Ph.D. Communicated by Sir James Dewar, F.R.S. 354

Ammonium Ferrous Sulphate and its Alkali-metal Isomorphs. By A. E. H. Tutton, D.Sc., M.A., F.R.S. 361

Studies of the Processes Operative in Solutions. XXVII.—The Causes of Variation in the Optical Rotatory Power of Organic Compounds and of Anomalous Rotatory Dispersive Power. By H. E. Armstrong, F R.S., and E. E. Walker, B.Sc. 388

On the Luminosity Curves of Persons having Normal and Abnormal Colour Vision. By W. Watson, D.Sc., F.R.S. 404

No. A 605.—July 1, 1913.

PAGE

The Reflection of X-rays by Crystals. By W. H. Bragg, M.A., F.R.S., Cavendish Professor of Physics in the University of Leeds; and W. L. Bragg, B.A., Trinity College, Cambridge 428

Studies of the Processes Operative in Solutions. XXVIII.—The Influence of Acids on the Rotatory Power of Cane Sugar, of Glucose and of Fructose. By F. P. Worley. Communicated by Prof. H. E. Armstrong, F.R.S. 439

The Decrease in Velocity of α-Particles in Passing through Matter. By E. Marsden, M.Sc., Lecturer, and T. S. Taylor, Ph.D., John Harling Fellow, University of Manchester. Communicated by Prof. E. Rutherford, F.R.S. 443

Synthesis of the Anhydrides of α-Aminoacyl Glucosamines. By Charles Weizmann and Arthur Hopwood. Communicated by Dr. A. Harden, F.R.S. 455

The Transition from the Elastic to the Plastic State in Mild Steel. By A. Robertson, M.Sc., and G. Cook, M.Sc. Communicated by Prof. J. E. Petavel, F.R.S. 462

The Attainment of High Potentials by the Use of Radium. By H. G. J. Moseley, B.A., John Harling Fellow, University of Manchester. Communicated by Prof. E. Rutherford, F.R.S. 471

On the Recombination of the Ions Produced by Röntgen Rays in Gases and Vapours. By H. Thirkill, M.A., Fellow of Clare College, Cambridge. Communicated by Prof. Sir J. J. Thomson, O.M., F.R.S. 477

The Flexure of Telescope Mirror-discs Arising from their Weight, and its Influence upon Resolving Power. By H. Spencer Jones, B.A., B.Sc., Jesus College, Cambridge, Isaac Newton Student. Communicated by Sir Joseph Larmor, F.R.S. 494

On the Electrical Emissivity and Disintegration of Hot Metals. By J. A. Harker, D.Sc., F.R.S., and G. W. C. Kaye, B.A., D.Sc., National Physical Laboratory ... 522

An Active Modification of Nitrogen, Produced by the Electric Discharge.—V. By The Hon. R. J. Strutt, F.R.S., Professor of Physics, Imperial College of Science, South Kensington 539

No. A 606.—July 18, 1913.

The Capacity for Heat of Metals at Different Temperatures. By E. H. Griffiths, Sc.D., F.R.S., and Ezer Griffiths, B.Sc., Fellow of the University of Wales. (Abstract) 549

On Fourier Series and Functions of Bounded Variation. By Prof. W. H. Young, Sc.D., F.R.S. 561

On a Condition that a Trigonometrical Series should have a Certain Form. By Prof. W. H. Young, Sc.D., F.R.S. 569

PAGE

On a Method of Measuring the Viscosity of the Vapours of Volatile Liquids, with an Application to Bromine. By A. O. Rankine, D.Sc., Fellow of and Assistant in the Department of Physics in University College, London. Communicated by A. W. Porter, F.R.S. 575

The Hall Effect in Liquid Electrolytes. By A. E. Oxley, M.Sc., B.A., Senior Scholar and Coutts Trotter Student, Trinity College, Cambridge. Communicated by Sir J. J. Thomson, O.M., F.R.S. 588

OBITUARY NOTICES OF FELLOWS DECEASED.

Samuel Hawksley Burbury ; Frederick John Jervis-Smith ; John Brown ; Edward Divers ; Henry Taylor Bovey ; Right Hon. Sir John Charles Dalrymple-Hay, Bart., G.C.B. ; Osborne Reynolds ..... i—xxi

Index xxiii

Errata, etc. xxvii